

The Effect of Contextual Visual Aids on High School Students' Reading Comprehension

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Abstract—The present study was an attempt to investigate the effect of contextual visual aids on Iranian high school students' reading comprehension. To do so, a thorough review of the related literature was done and a quasi-experimental study was designed in which the participants were 96 female EFL learners at the intermediate level. These participants were chosen out of 140 learners through a homogeneity test. The selected participants were assigned to four groups; three experimental groups (pre-thematic, thematic and post-thematic) and one control group. The participants went through the procedure of pretest, treatment, and posttest. The data was collected by means of three tests: a PET test, a pretest and a posttest of reading comprehension. A one-way ANOVA was run to probe the research questions posed in this study. The findings revealed that contextual visual aids had a statistically significant effect on Iranian high school students' reading comprehension. The study findings also revealed that among the Contextual Visual Aids, pre-thematic aids had the highest effect on high school students' reading comprehension. This was followed by thematic visual aids which had a moderate effect on this process. However, the post-thematic visual aids had slightly significant effect on high school students' reading comprehension.

Index Terms—pre-thematic contextual aids, thematic contextual aids, post-thematic contextual aids, EFL, reading comprehension

I. INTRODUCTION

Can pictures facilitate one's comprehension of a text? A significant body of research (Daley, 2003; Eisner 2002; Evans 2003; Mackay, 2003) addresses this question directly. The results of such studies prove that visuals in text have positive effects on readers' comprehension (Liu, 2007).

Hibbing and Rankin-Erickson (2003) believe that the supplementation of texts with visuals provides readers with two supplies of information when reading the material. When the readers cannot comprehend a particular text, they may shift their attention from the text to the accompanying visual images. In return, the visuals which they comprehend may lead them to notice the text's linguistic input and thus enable them to comprehend the text through matching factors such as syntax, word recognition, intertextual perceptions, and background knowledge. Then, the interaction between the text and visuals will facilitate readers' comprehension

Lots of research studies support the effectiveness of presenting pictures to help L2 learners' reading comprehension, especially if the learners are at the lower levels of proficiency (Fukuyama, 2006). These studies indicate that presenting pictures contextually related to the content of the passage prior to reading not only provides the readers with background information, but also activates an organizational schema for the text as a whole by facilitating top-down processing; therefore, enhances comprehension of the story (Ausubel, 2000). Omaggio (as cited in Fukuyama, 2006) proved that among the pictures she presented to the participants, the best visual context was the one depicting a scene from the beginning of the story.

A. Statement of the Problem

Reading comprehension is one of the problems of Iranian students in different levels (Rasti, 2009). Success in comprehending the written materials is considered an ever present problem in the EFL classes in the Iranian context in general and in the high school classes in particular (Amiri & Maftoon, 2010). Erfani (2012) also presents that one of the areas which require investigation is the low achievement of reading comprehension among Iranian learners. Even in the IELTS examinations one of the skills in which the Iranian examinees receive low scores is reading comprehension (Rasti, 2009).

Therefore, the current study is designed to expand upon the effects of contextual visuals on English as a Foreign Language (EFL) reading comprehension; with focus on examining what kinds of pictures might be best to use for high school contexts. Moreover, the researcher hypothesizes that reading comprehension of a foreign language text would be facilitated by prior presentations of contextual visuals.

B. Research Questions and Hypothesis

The following research questions and hypothesis are presented:

RQ₁: Do contextual visual aids have a statistically significant effect on Iranian high school students' reading comprehension?

RQ₂: Do the pre-thematic pictures, in comparison to thematic and post-thematic ones, have significant effects on enhancing Iranian high school students' reading comprehension?

H01: Contextual visual aids have no statistically significant effect on Iranian high school students' reading comprehension.

H02: Different forms of contextual visual aids do not have different significant effects on enhancing Iranian high school students' reading comprehension.

II. LITERATURE REVIEW

Research has generally showed that visuals improve learners' reading comprehension, but there are few studies that reveal what kinds of pictures might be the best to utilize, that is pre-thematic, thematic, or post-thematic pictures (Fukuyama, 2006). This can be considered as a noticeable gap in the realm of the studies on utilizing visual aids in enhancing learners' reading comprehension.

The findings of the present study could contribute both theoretically and practically to language teaching. Although there has been an ocean of research studies conducted on text comprehension from different and differing angles, but literature review proves that we still have a lack of empirical research and studies dealing with the effect of specific contextual visual aids such as pre-thematic, thematic and post-thematic pictures on reading comprehension among Iranian high school students' reading comprehension.

The purpose of the present study, therefore, is firstly to investigate the effect of contextual visual aids on high school students' reading comprehension in the immediate posttest, which presents a specific recall situation, and secondly to investigate the specific form of contextual visual aids (pre-thematic pictures, in comparison to thematic and post-thematic ones) on enhancing Iranian high school students' reading comprehension. Among the various ways suggested for the promotion of EFL learners' reading comprehension, the method of using pictures and contextual visual aids has recently been canonized (Pan & Pan, 2009).

Comprehension is identified as an acquired skill that is focused on the understanding of input. Oxford English Dictionary (2010) defines comprehension as "the action or fact of comprehending with the mind; understanding; ... grasping with the mind, power of receiving and containing ideas." According to Brown (2007), comprehension is "the process of receiving language; listening or reading; input" (p. 379).

Comprehension is recognized as the ability to take in data, analyze it, and come up with an understanding of the input in an accurate and cohesive manner. Well-developed comprehension abilities include using interactive strategy to achieve a meaningful understanding of the input (Lin, 2010). Therefore, comprehension is affected by input while it affects the fluency of a learner's output.

There have been several different views to accurately define L2 reading comprehension. A thorough literature review reveals that there is not a single kind of comprehension. Brantmeier (2003) stated that there "is not one true comprehension, but a range of comprehension" (p. 4). Day and Park (2005), on the other hand, classified reading comprehension into six different modes of comprehension that can work together in parallel or in a linear fashion:

(1) Literal comprehension is described as the "understanding of the straightforward meaning of the text" (Day & Park, 2005, p. 62). This means that any answers to questions coming from a text would be explicitly outlined in the reading. Discovering specific words or their meanings within a text is an example of this.

(2) Reorganization occurs when readers must find different pieces of data from a reading text and combine them for additional understanding. In this way, readers still use literal comprehension, but it is applied to several areas of text in order to answer more specific questions related to the text (Day & Park, 2005).

(3) Inference requires learners to go a step beyond literal understanding and to use their own knowledge in order to find the implicitly stated information (Day & Park, 2005).

(4) Prediction combines readers' prior knowledge with their understanding of a passage in order to guess what happens next; however, in order to be valid, each answer must be supported by the text (Day & Park, 2005).

(5) Evaluation requires a learner to have a general knowledge of the topic under examination and an understanding of the reading material in order to give judgment or opinion about the text (Day & Park, 2005).

(6) Personal response is an open-ended type of comprehension used by readers to express their feelings about the topic. In order for the feelings to be valid, readers need to reason them in relation to the text (Day & Park, 2005).

There has been a large body of research in L2 reading comprehension which has identified such significant factors including, lexical processing (how the brain makes meaning out of input), eye movements, cultural familiarity, and first language (L1) that affect L2 comprehension.

A. *The Effect of L1 on L2 Reading Comprehension*

The L1 provides significant background information, cultural views, and linguistic knowledge in L2 reading comprehension (Fecteau, 1999). L1 plays a role in both lower-level comprehension and advanced comprehension, but in quite different ways. For instance, having insufficient knowledge of the language to demonstrate understanding in the

L2, lower-level L2 readers of English may use their L1 to convey their understanding of the text they just read (Fecteau, 1999). However, upper-level L2 readers of English may employ their L1 reading strategies in L2 tasks. In order to do this, they might need a higher level of reading proficiency (Hill, 2011). Studies proved that both L1 reading skills and L2 linguistic knowledge affect L2 reading comprehension (Fecteau, 1999). For example, many L2 reading comprehension errors result from lack of enough lexical knowledge which, depending on the reader's proficiency level, can be supplied by L1 lexical inference, (Fecteau, 1999).

B. Teaching Methods of Reading

There are many approaches towards teaching techniques of reading comprehension, however, most have drawbacks which demonstrate that there is no one way for teaching comprehension successfully to all L2 readers (Brantmeier, 2003). Common teaching methods used for reading comprehension instruction and their pros and cons are discussed below:

1. *Comprehension Monitoring* which is defined as "the ability to know what has been done right or wrong, and to integrate new information with prior existing knowledge" (Yang, Y., 2002, p. 19).
2. *Bottom-Up Approach* in which individual units or pieces of language contribute to the overall interpretation of text (Celce-Murcia, 2001).
3. *Top-Down Approach* that means to get the text's overall purpose in order to understand isolated sounds and words (Celce-Murcia, 2001).

C. Intensive and Extensive Reading

According to Richards and Schmidt (2002), intensive reading is related to further improvement in language learning under the teacher's guidance. It provides a basis for extending knowledge of vocabulary as well as explaining difficulties of structure. Thus, intensive reading mainly deals with comprehension at lexical and syntactic level (Rashidi & Piran, 2011).

Comprehension beyond the above mentioned two levels (i.e., lexical and syntactic level) deals with another sub-skill of reading that is, extensive reading. According to Richards and Schmidt (2002), extensive reading means reading in a large quantity in order to gain a general understanding of what is read. Extensive reading is intended to develop good reading habits, to build knowledge of vocabulary and structure, and to encourage the learners for reading (Richards & Schmidt, 2002). The aim of extensive reading is to train the learners to read fluently and directly in the target language for enjoyment without the help of the teacher (Rashidi & Piran, 2011).

Schmitt (1988) also points out the difference between extensive reading and intensive reading. He states that people learn how to read just by reading (Smith, 1988). However, extensive reading differs from intensive reading. In intensive reading, students normally deal with short texts and close guidance from the teacher. The aim of intensive reading is to develop reading skills, such as recognizing text connectors and identifying main ideas, to help students obtain detailed meaning from the text, and to enhance vocabulary and grammar knowledge. It is important to note that these two approaches to teaching reading (i.e., intensive and extensive reading) should not be considered as the opposites, since both serve different but complementary purposes (Renandya, 2007).

D. Reading Strategies

Success in reading comprehension is not an inborn capacity and it can be learnt. Thus, four variables have to be taken into consideration to learn how to read successfully: the reader, the text, the strategies, and the goal. As far as readers are concerned, their reading skills, as well as their interest in the topic, are vital. Some factors like hunger or sleepiness also play a crucial role. All these factors influence the success in reading (Nadera, 2001).

There are many different reading strategies, but they are all based on the same basic assumptions. First, the readers should think about the purpose of reading. Second, they should look at the title, headings, pictures, or any other visual cues accompanying the text. Third, they should read the introduction and conclusion, or read the first line in every paragraph, then read the entire text. Fourth, the whole text should be scanned to look for the most critical parts to focus on during detailed reading. Fifth, the readers should take notes as they read. Sixth, having problems with understanding the text, the readers should stop and reread it once again. Seventh, since the longer the readers work with the text, the less they can focus on it entirely; long texts should be divided in shorter parts. Finally, the readers should retell difficult material in their own words, and possibly answer the questions concerning the contents of the text (Rashidi & Piran, 2011).

After the reading has been completed, the text ought to be considered in three ways. The basic data provided on the printed page should be thought about. Then, additional information from between the lines should be drawn, and finally, the meaning of the text should be referred to the readers' own experience (King, 1999). The description of some reading strategies are provided below to illustrate particular steps they entail.

The *skimming* strategy is utilized whenever the reader needs to get an overall idea of the passage. Applying this strategy, the readers are enabled to say what kind of text it is and what kind of data it contains. Thus, the readers can expect what the passage is about and, consequently, they can activate appropriate schemata. Estimating the relevance of the text by skimming it quickly, the readers can decide whether the text is relevant for their particular purposes. Since this technique provides the reader with the main ideas of the text, it affords a logical framework for details to be fitted

into it during more intensive reading. It is critical to note that during skimming the readers pay no attention to details and even can skip new words provided that the text can still be understood (Nadera, 2001).

However, if the readers need to quickly look for specific key words or data, *scanning* should be applied. During scanning the readers move their eyes down the text in search for particular data. Since they can be key words in the text, unfamiliar words encountered in the text should be looked up in a dictionary. Scanning is also very helpful if the reader needs to search out statements, definitions etc. To sum up, the use of both skimming and scanning improves retention of important details contained in a reading passage, as well as the speed of completing a reading task (Renandya, 2007).

SQ3R, SQ4R, and PQ4R strategies refer to particular steps which are suggested to be taken during reading. 'S' stands for survey, 'Q' for question, 'P' for preview or purpose, and 'R' can stand for read, recite, review, reflect or write. Although some other differences also exist, all the listed methods mainly differ as far as the number of 'R' factors is concerned (Nadera, 2001).

E. Concomitant Processes in Reading Comprehension

"The reader rather than the text is at the heart of reading process" (Nunan, 1995, p. 65). Therefore, the focus of all language teachers and linguists carrying research on reading behavior should be on the readers' mental processes, rather than merely on processes which a text undergoes. The way the readers arrive at the meaning is of paramount importance (Nunan, 1995).

Mental representations, in the next stage, are integrated into the existing mental model of the subject matter which is aided by cognitive schemata. Additionally, "the text comprehension can be facilitated by multimedia aids such as pictures, animations and other visual or auditory cues. Multimedia aids are independent of the presentation mode of the text; however, they support the process of text comprehension" (Chun & Plass, 1997, p. 71).

Cognitive Schemata: Reading a passage, readers make some assumptions about the contents of it and, on the basis of their background knowledge, predict the events that will happen. Rumelhart (1977) provided a short fragment of a story to be considered as an example. It begins with "Mary heard the ice cream man coming down the street. She remembered her birthday money and rushed into the house..." (Rumelhart, 1977, p. 265). These few words are enough for most readers to guess why Mary rushed into the house. The interpretation seems to be obvious: she needed to take the money and buy an ice cream. Such data is not contained in the passage, but readers consider it unavoidable unless it is contradicted by some other data. After all, Mary could have been afraid that the ice cream man could steal her money and she wanted to hide her possession (Hill, 2011).

Such concepts that help readers interpret the text are called cognitive schemata. The term was first used by Barlett in 1932 (Nunan, 1995). According to schema theory, "the readers' background knowledge and linguistic cues contained in the text are organized into interrelated patterns which are made use of in reconstructing meaning" (Nunan, 1995, p. 68).

Mental Model: According to Chun and Plass (1997), "a mental model is a mental representation consisting of parts that interact with one another according to principle-based rules" (p. 64). Mental models of actions with involvement of characters are constructed when the learners read a text.

There are three categories of mental models:

- Category A: representations of actual objects, events, or situations;
- Category B: representations of imagined objects, events, or situations; and
- Category C: structures which combine these, plus sundry individual stimuli, into a fully integrated functional unit (Hill, 2011).

Multimedia Aids for Comprehension: Three types of the aids can be distinguished:

- Aids for selecting information
- Aids for building internal connections
- Aids for building external connections

F. Theoretical Background of Utilizing Visuals in Language Learning

Many researchers have employed various theoretical frameworks to describe the visual effects on learning. In other words, the proponents of the positive effects of using visuals on language learning in general and reading comprehension in particular have employed a number of theoretical frameworks to explain and predict the effects of pictorial context on reading comprehension (Erfani, 2012). The most important ones are the theory of mental models (Johnson-Laird, as cited in Erfani, 2012), the transmediation theory (Siegle, 1995), the repetition hypothesis (Gyselinck & Tardieu, 1999) and the dual coding theory (Sadosky & Paivio, 2001). The most comprehensive theory that elaborates upon the relationship between pictures and reading is the dual coding theory (Erfani, 2012).

Undoubtedly, one of the influential rationales behind using pictures and text together is Paivio's (1991) dual-coding theory. In other words, mental representations consist of two distinct knowledge systems: (a) Nonverbal systems which are related to holistic processing of data, and (b) Verbal systems which are related to abstract and sequential processing of data. When reading text and related pictures are presented together, verbal and nonverbal data are processed in different cognitive systems. However, they are interconnected and integrated and lead to better retention of data and enhanced learning (Jee & Li, 2014).

G. Empirical Studies on the Learning Effect of Visual Aids

Different types of images are used in language learning materials to improve understanding of the language. The findings of empirical studies in L2 language acquisition show that dynamic images can act as effective advance organizers and improve students' comprehension and retention of material in those multimedia applications. When creating multimedia applications, it is essential for teachers and designers to determine the type of images to be incorporated in accordance with the objectives of teaching. Therefore, the effects of images should be investigated empirically (Fukuyama, 2006).

A large body of research supports the effectiveness of presenting pictures to help L2 learners' reading comprehension, especially if the learners are at the lower levels of proficiency (Fukuyama, 2006). These studies indicate that presenting pictures contextually related to the content of the passage prior to reading not only provides the readers with background information, but also activates an organizational schema for the text as a whole by facilitating top-down processing; therefore, enhances comprehension of the story (Ausubel, 2000). Omaggio (as cited in Fukuyama, 2006) proved that among the pictures she presented to the participants, the best visual context was the one depicting a scene from the beginning of the story.

Numerous researchers have used DCT as a theoretical framework to examine whether or not contextual visuals improve readers' comprehension of a text. Purnell and Solman (1991) proved in their study that students received both the text and the visuals performed better than those received the text alone. The findings are in accordance with DCT in that activation of both codes can have additional effects on comprehension (Paivio, 1991).

Other findings also demonstrate consistency with DCT. An investigation conducted by Kullhavy, Lee, and Caterino (as cited in Pan & Pan, 2009) proved that fifth graders understood data in maps and prose directions better when it was presented in both spatial and elaborated verbal forms rather than either form alone. In another study carried out by Gambrell and Jawitz (1993), students who had access to both text and illustrations performed better than those who had studied text alone.

Furthermore, Hall, Bailey, and Tillman (1997) conducted a study to examine the effects of illustrations on reading comprehension, and the findings indicated that the with-illustration groups outperformed the text-only group. Using DCT as the basis for their theory, the researchers demonstrated that there was a marked improvement in participants' comprehension when they were exposed to data presented and processed in both verbal and imagery systems.

In another study on reading comprehension, Tang (1992) asked one group of seventh-grade EFL students to read academic texts with the help of graphic classification trees reflecting the organization of the text; another group of students read the text without the graphic trees. The results proved that the students who had the graphic trees performed significantly better on comprehending the text.

Further evidence is the research conducted by Hudson (1982). The results of his study revealed that reading comprehension in lower proficiency students enhanced when the students first viewed some pictures related to the passage, then were asked some questions, and finally wrote down predictions before reading the passage. Regarding the findings, Hudson concluded that the visuals facilitated reading comprehension because they offered additional contextual data to the students, confirming the value of DCT.

In a nutshell, reading research studies within the DCT framework indicate that the combination of text and visuals have beneficial effects on the comprehension of the materials. Visuals not only offer additional contextual data to facilitate comprehension, but also trigger referential connections between verbal and imagery systems, and therefore provide an additional route for comprehension. It is believed that the use of visuals in the enhancement of instructional materials will improve reading comprehension (Pan & Pan, 2009).

III. METHODOLOGY

The participants of the study were 96 intermediate level female students in the age range of 15 to 16 studying at Hekmat high school in Parsabad city, Iran. These participants were chosen from 140 intermediate students according to their performance in a sample Preliminary English Test (PET).

The data for the present study were collected by means of three tests: a PET test, a researcher-made test of reading comprehension as the pretest and another researcher-made test of reading comprehension as the posttest.

In the present experiment, a series of reading texts which were pictorial English short stories suitable for the level of the participants in the current study were used.

The first phase of this study was the pilot phase during which 30 intermediate students with similar characteristics in age, level, and gender participated. Item analysis was performed for all the items in the reading tests and the malfunctioning items with unacceptable facility and discrimination indices were removed.

In the second phase of the study the participants were selected. First, the piloted PET was administered to 150 intermediate students to homogenize them regarding their general English proficiency. Out of 150 students, 100 students whose scores fell one standard deviation above and below the mean shaped the main participants of the study. The selected participants were assigned to three experimental groups, namely pre-thematic, thematic and post-thematic and one control group with 20 to 30 students in each.

In the third phase, the participants of the study in all groups took part in the piloted teacher-made multiple choice reading comprehension pretest to assure their homogeneity regarding their reading comprehension.

Then the treatment period began and continued for 16 sessions. The whole semester included eight weeks and the learners attended the classes two days a week each session lasting for 90 minutes in all groups. Considering the fact that the syllabus of the high school should be covered during this semester too, 30 minutes was allocated to the experiment in the experimental groups. Therefore, the classes of experimental groups and the control group received the same hours of instruction and practice. Also the researcher herself taught all the groups. Hence, the researcher tried to keep all the conditions for the experimental and control groups the same.

In order to conduct the present study, four intact high school classes were used under the following four contextual conditions: (a) no visual context, (b) pre-thematic context, (c) thematic context, and (d) post-thematic context (Fukuyama, 2006). All participants read the same passage under one of the four conditions. Prior to reading, using power point slides, the participants of the experimental groups were provided with illustrations related to the content of the reading passage. The pictures depicted scenes from the beginning (i.e., pre-thematic context) for the experimental group A, the climax (i.e., thematic context) for the experimental group B, and the end of the story (i.e., post-thematic context) for the experimental group C. Meanwhile, the control group was instructed to read the passage with no pictures. Then each group received a copy of the same reading passage, and was given time to read it. Immediately after reading the passage, the participants were asked to answer a 10-item discrete point test for reading comprehension based on the material found in the reading passage not in visual contexts. It is also worth mentioning that the same teacher handled all four classes to control the possible effect of different teachers on students' learning.

Following the treatment the learners in all groups received the posttest of reading comprehension. The posttest was administered for the purpose of checking the effect of the treatment on the reading comprehension of the participants.

IV. DATA ANALYSIS

The one-way ANOVA was followed by planned (a-priori) contrasts in order; a) to compare the three experimental groups with the control group to probe the first null-hypothesis, and b) to compare the pre-thematic group with thematic and post-thematic groups to investigate the second null-hypothesis.

As displayed in Table 1 the pre-thematic ($M = 20.44$, $SD = 3.26$) had the highest mean on the posttest of RC. This was followed by thematic ($M = 16.60$, $SD = 2.30$), post-thematic ($M = 14.91$, $SD = 2.35$) and control ($M = 14.57$, $SD = 1.03$) groups.

TABLE 1
DESCRIPTIVE STATISTICS, POSTTEST OF RC BY GROUPS

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Control	23	14.57	1.037	.216	14.12	15.01
Pre-thematic	25	20.44	3.267	.653	19.09	21.79
Thematic	25	16.60	2.309	.462	15.65	17.55
Post-thematic	23	14.91	2.353	.491	13.90	15.93
Total	96	16.71	3.337	.341	16.03	17.38

Based on the results displayed in Table 2 ($F(3, 92) = 30.58$, $P = .000$, $\omega^2 = .430$ representing a large effect size) it was concluded that there were significant differences between the means of the four groups on the posttest of RC.

TABLE 2
ONE-WAY ANOVA, POSTTEST OF RC BY GROUPS

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	528.195	3	176.065	30.583	.000
Within Groups	529.638	92	5.757		
Total	1057.833	95			

The results of planned (a-priori) contrasts indicated (Table 3) that;

A: The three experimental groups ($t(92) = 4.79$, $p = .000$) had significantly higher mean than the control group on the posttest of RC. Thus, the first null-hypothesis of the study was rejected.

TABLE 3
CONTRAST TESTS; POSTTEST OF RC

Contrast		Value of Contrast	Std. Error	t	Df	Sig. (2-tailed)
Posttest	Assume equal variances	1	8.26	1.722	4.797	.000
		2	9.37	1.184	7.912	.000
RC	Does not assume equal variances	1	8.26	1.141	7.237	.000
		2	9.37	1.470	6.371	.000

B: The pre-thematic groups ($t(92) = 7.91$, $p = .000$) had significantly higher mean than the thematic and post-thematic groups on the posttest of RC. Thus, the second null-hypothesis as of the study was rejected.

V. CONCLUSION

The findings revealed that contextual visual aids had a statistically significant effect on Iranian high school students' reading comprehension. The study findings also revealed that among the *Contextual Visual Aids*, pre-thematic aids had the highest effect on the high school students' reading comprehension. This was followed by thematic visual aids which had a moderate effect on this process. However, the post-thematic visual aids had a slightly significant effect on high school students' reading comprehension. The findings could be employed by English teachers, EFL learners, and materials developers in the field of ELT in the Iranian context to pave the way for the improvement of ELT status in the EFL classes.

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